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Kogan

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(54) **ELECTRICAL SAFETY METHODS,
DEVICES, AND SYSTEMS FOR MEDICAL
TREATMENT DEVICES**

(58) **Field of Classification Search**
CPC A61M 5/16831; A61M 5/5086; A61N 1/08
See application file for complete search history.

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(56) **References Cited**

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U.S. PATENT DOCUMENTS

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patent is extended or adjusted under 35
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8,777,887 B2* 7/2014 Jonsson A61M 1/16
128/908

2005/0267698 A1 12/2005 Gordon
2006/0030917 A1 2/2006 Eccleston et al.
2007/0095400 A1* 5/2007 Bergquist F16K 7/14
137/485
2010/0312161 A1 12/2010 Jonsson et al.

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FOREIGN PATENT DOCUMENTS

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OTHER PUBLICATIONS

(87) PCT Pub. No.: **WO2012/170942**

International Search Report and Written Opinion for International
Application No. PCT/US12/41740, dated Aug. 10, 2012.

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* cited by examiner

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(57) **ABSTRACT**

Systems, methods, and devices can detect a dangerous or
adverse condition or anticipated condition that indicates an
undesirable amount of electric current in a patient-connected
tube providing fluid to a patient. The fluid flow to the patient
is stopped responsive to the detection. Stoppage of fluid flow
to the patient can reduce or prevent electric current in the
fluid from reaching a patient, flowing through the patient to
ground, and/or continuing to flow through the patient.

(51) **Int. Cl.**

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(52) **U.S. Cl.**

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25 Claims, 7 Drawing Sheets

